APPENDIX - IV-A

SYNOPSIS OF PROPOSED RESEARCH WORK

(1) Name of the Scholar (In English) :- **Mr. ANIL KUMAR SHARMA**

(हिन्दी) :- श्री अनिल कुमार शर्मा

(2) Title of the research work (In English) :- Population status, Distribution and Breeding Biology of Black-headed Ibis (*Threskiornis melanocephalus*) in Bhilwara district of Rajasthan.

(हिन्दी) :- ब्लेक हेडेड आइबिस (*Threskiornis melanocephalus*) का राजस्थान के भीलवाड़ा जिले मे समष्टि की स्थिति, वितरण एवं प्रजनन विज्ञान

(3) Location :-

a. Department where the work is to be done : **Department of Zoology, M.L.V. GOVT. COLLEGE, BHILWARA**

b. Geographical area of Investigation, if any. Bhilwara district of Rajasthan

(4)

(A) Introduction Importance of proposed investigation :-

Biodiversity is the variety and variability of living organisms and their ecological complexes in which they occur. Many ecological factors are responsible for ecosystem balance. Birds are the best ecological service provider and good bio-indicators of quality of the ecosystem and health of the environment. In India about 1223 bird species are

identified in India. About 88 bird species are extinct last 2000 years. Rajasthan is a huge state of India by area (3,42,239 km) and is located on the northwest side. Bhilwara district is located in the South-Central region of Rajasthan. Bhilwara district of this region is relatively more suitable for aquatic birds due to high rainfall and numerous wetlands. Black-headed Ibis (*Threskiornis melanocephalus*) is a near-threatened species commonly found in the oriental region of the Earth. It is belonging to the *Threskiornithidae* family and is a white water bird with having long down curved black bill and head is bare and black. The tail bears grey ornamental feathers. They are also known as Oriental White Ibis, Black-headed Ibis, Black-necked Ibis, Oriental black-necked ibis etc. Therefore the study is planned to understand the distribution, population, roosting, nesting and breeding of near-threatened species in Bhilwara district of Rajasthan. The collected data during the survey will help to conserve the species.

(B) Objectives :-

1. Distribution of Black-headed Ibis in Bhilwara district.
2. Population status of Black-headed Ibis in Bhilwara district.
3. Roosting behaviour of Black-headed Ibis in Bhilwara district.
4. Habitat preference of Black-headed Ibis in Bhilwara district.
5. Feeding ecology of Black-headed Ibis in Bhilwara district.
6. Nesting ecology of Black-headed Ibis in Bhilwara district.
7. Breeding ecology of Black-headed Ibis in Bhilwara district.
8. Conservation issues of Black-headed Ibis in wetlands of Bhilwara district.

(5) Review of work already done on subject :-

Choudhary and Koli, 2017. A leucistic adult has black-coloured legs and bill, white coloured head and upper parts of the throat, pure white-coloured nape but some greyish areas were seen around the eyes and front of neck.

Ali and Repley, 1987; Soothill and Soothill, 1989. The Black-headed Ibis is a common bird of Southern, Northern and Western India, and has a wild global range extending from Pakistan to Myanmar, China and Japan.

Koli, 2018. Most individuals of Black-headed Ibis were recorded in wetlands of Southern Rajasthan during summer and winter seasons but highest number was recorded in grazing areas and sewage lines in Southern Rajasthan during rainy season.

Choudhary and Koli, 2016. Oriental White Ibis generally feeds upon fishes, frogs, water creatures, insects, snails, worms, crustaceans etc. but the carcass of domestic cattle is an additional food item of this species.

Koli, Yaseen and Bhatnagar, 2013. Total 303 and 296 individuals were recorded during 2008 and 2009 respectively in six districts of Southern Rajasthan but highest in Chittorgarh district.

Koli, Choudhary and Sundar, 2018. About 50 roosting sites were recorded in Southern Rajasthan in urban and rural areas with other roosting birds such as egrets, herons, other ibis species and storks.

Kannan, Manakadan and Sykes, 2010. They observed a red-coloured patch on the hind neck. Only one individual among the 200 nesting birds shows this characteristic. The first bird of this characteristic was seen at Bharatpur on 21 August 2005 and the second was seen at Basai on March 21, 2010. This red-coloured patch is more or less constant for several weeks.

Chandrasekaran, Saraswathy, Sravanan, Kamaladhasan and Nagendran, 2014. The nest locations in *Prosopis julliflora* and *Acacia nilotica* and compared qualitatively. The number of nests per tree was higher in *Prosopis julliflora*. There is no difference in the number of eggs per nest on both plant species. The percentage of fallen eggs and chicks on the ground per nest is higher in *Prosopis julliflora* trees. The final number of fledglings per nest was higher in *Acacia nilotica* trees. The branching architecture of *Acacia nilotica* overlapped so the mortality rate is higher in *Prosopis julliflora* trees than

in *Acacia nilotica* because the branching angle was higher in *Prosopis julliflora* resulting greater sliding of eggs and chicks from the nests in *Prosopis julliflora.*

Devkar, Khanpara, Bhimani and Katara, 2005. Oriental White Ibis also prepared nests in crowded urban areas without any disturbance**.**

Dayananda, 2009. Oriental White Ibis are piscivorous bird.

Koli, 2018. Almost nests on *Prosopis julliflora* and *Acacia nilotica* trees with cattle egrets and great egrets.

Jha, 2012. Nest occupation period is 101 days, the Pre-egg laying period was 49 days, the Incubation period 52 days and the chick-rearing period 69 days were recorded from this site. Predation of heronry birds by crows, eagles, jays, snakes and lizards has been reported**.**

This bird remained very active between July and August like most wading birds (Ali S.) due to the availability of insects and fishes.

Narayanan, Sreekumar and Thomas, 2011. Tourism, sewage and industrial pollution, eutrophication, felling of nesting and roosting trees, hunting, overgrowth of exotic vegetation etc. are major threats to the wetland birds.

Iqbal and Hasudungan, 2012. The population of Black-headed Ibis in East Asia is extremely small and in South-East Asia, including Indonesia less than 10000 individuals. About 735,607,244,103,10,11 Black-headed Ibis in 1984,1985,1986,2001,2002,2003 respectively in the southern Sumatra province of Indonesia. Only one Black-headed Ibis was reported on the Banyuasin peninsula, South Sumatra. No birds were seen in Aceh province, North Sumatra, Riau province and Lampung province within 2008-09. So the historical and present status of Black-headed Ibis is only in the east coast of Sumatra. Hunting of the bird and, breeding grounds destruction due to drainage and land conversion to agricultural fields leads to the rapid decline of the Black-headed Ibis in Southern Sumatra. The species should be classified as Endangered in Sumatra.

Altaf, Umair and Ali, 2018. Urbanization, habitat fragmentation, habitat destruction, agriculture intensification, eutrophication and pollution are major threats for leading bird species toward extinction.

(6) Research gaps identified in the proposed fields of investigation :-

At present, no details study was carried out on its population status, distribution and breeding biology in the Bhilwara district of Rajasthan. Only the ecology and ethology of Black-headed Ibis were described in Southern Rajasthan (Koli and Choudhary). Therefore detailed investigation on the population status, distribution and breeding biology of Black-headed Ibis (*Threskiornis melanocephalus*) in Bhilwara district is very important to fill this gap. This will create a complete baseline data on Black-headed Ibis in Bhilwara district.

(7) Major Hypothesis :-

Major research hypotheses regarding the proposed study are:-

1. As colonial breeders, the spatial distribution of nests may occur on the basis of nesting time at the same place.

2. Seasonal nesting on long trees preferably surrounded by water for safety purposes and feeding habitat at the shore of these wetland areas.

(8) Materials and Methodology :-

Distribution:

Black-headed Ibis can be seen in shallow wetland areas in Bhilwara district. A motorcycle will be used at a speed of 20-30 km/hr and all individuals visible 50-800 m on either side of the road will enumerate. For counting birds, I will use the direct observation method and VANGUARD FR-1650 W binocular.

Habitat preference:

Most aquatic birds prefer natural wetlands for their routine activities. The number of Black-headed Ibis is different according to the season in a particular microhabitat such as sewage lines, perennial wetlands, grazing open areas, irrigation canals, crop fields, municipal garbage sites and other habitats (wastelands, degraded scrub forests, grasslands, rivers and human habitation).

Feeding:

The direct observation method will be applied to studying of feeding and foraging mechanism of Black-headed Ibis. Observations on feeding behaviours like scanning for predators, food items taken, number of steps, regurgitation time and other activities. A "VANGUARD FR-1650 W" binocular to record the number of Black-headed Ibis found in different microhabitats. "NIKON D500" camera with NIKON 200-500 mm lens will be used to record specific events. A hand tally counter will used to determine the number of pecks during feeding.

Nesting:

The species nest with several other bird species. Several parameters for the nesting site will be noted-

1. Material used

2. Habitat structure

3. Estimation of nest size and number

4. Structural parameters of the nest

5. Positional parameters of the nest

Roosting behaviour:

I will identify the roosting sites in Bhilwara district. These sites will be classified into urban and rural sites. These urban and rural sites are further classified into temporary and

permanent sites. The direct observation method will be applied for the selection of roosting sites.

Breeding biology:

During the breeding, The courtship behaviours, time of courtship, mating, egg laying, number of eggs, eggshell color, the shape of eggs, incubation, Incubation period, hatching and breeding success will be observed from a distance (about 40m). Breeding success are following-

Hatchling success - Comparison between the number of laid eggs and the number of hatchlings.
Nestling success - Comparison between the number of hatchlings and the number of nestlings.
Fledglings success - Comparison between the number of nestlings and the number of fledglings.
Nest success - Comparison between the number of fledglings and number of eggs laid.

Conservation issues:

Conversation-related problems will be accessed during the survey in Bhilwara district. Locals will be interviewed about the conservation problems of species like hunting, disturbance at breeding colonies, agricultural activities and destruction of breeding habitat etc.

Equipment :-

1) VANGUARD FR-1650 W binocular

2) NIKON D500 camera with NIKON 200-500 mm lens

3) Stopwatch

4) GPS for location **(GPS essential Mobile App)**

5) Measurement tape

6) Thermometer

7) Hygrometer

8) Luxmeter

9) Hand tally counter

1. For the study of nest and nest contents, the direct observation method will be applied. Some of the nests from different nesting trees will be examined to observe the nest composition and weight and nesting material being used during dry months. Measurement of nest diameter from the middle part of the nest periphery from one end of the edge to the widest edge of the other end (Sykes, 1987). The depth of nest cup was measured from the centre of the nest bottom to the horizontal plane of the rim. Bird Census Techniques (Colin, 1992) will be used for population estimation.

2. Regular visits will be made in the morning hours (6 to 8 am) and evening hours (4 to 8 pm).

3. The behaviour aspects will be recorded with a VANGUARD FR-1650 W binocular.

4. NIKON D500 Camera on a tripod at different times of the day to cover various activities like nest building, courtship and mating, egg rolling, feeding to hatchlings and fledglings.

5. Photographic records will be maintained using NIKON D500 camera.

Scan Sampling Method :- This method is intended to imitate a series of instantaneous photos of study birds, with successive photos taken at a specified time interval. Since we can't record what all the birds are doing instantaneously, the best approximation is to visually scan from one end of the study population to the other, recording what each bird is doing at the first instant that is seen.

Focal Method :- This method is usually used for the study of animal behavior. In this method, a bird shall be observed and assessed for a specified period of time. In this

period either a few selected behaviours or everything would be observed for the data, which would be repeated for different birds at different times.

Ad libitum (Ad-lib) Method: - In this method, any behavior which shall be seen as interesting or important will be recorded. In this sampling, we shall be able to record a wide range of behavior and will be able to learn what is normal or what is not.

Visual Encounter Method (Surveys):- This method shall be used in which each zone will be randomly explored on the basis of habitat structure such as water bodies, roadside, farmland, urban parks, the forested area and shrubs and herbs.

Local peoples will be also provides knowledge about the local birds of the Bhilwara district.

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Signature of the candidate with date

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